

Herbicide Use Benefits Water Conservation Efforts

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The Ogallala Aquifer stretches across eight states from South Dakota in the north to Texas in the south. Ogallala groundwater is largely non-renewable because its sources in the Rocky Mountains were cut off thousands of years ago. The aquifer contains enough water to fill Lake Erie nine times [1]. However, at the current withdrawal rate, the Ogallala will be completely drained in 200 years.



Irrigation water from the Ogallala Aquifer supports nearly one-fifth of the wheat, corn, cotton, and cattle produced in the US. Depletion of the groundwater threatens the long-term sustainability of irrigated agriculture in major parts of the Southern High Plains, with the most critical depletion area occurring in the Texas High Plains.

Tillage to control weeds has been practiced in the region for many years. Tillage results in increased need for irrigation because of considerable water loss from the soil due to evaporation from each tillage operation.

Although the potential for increased water conservation with no-till farming was illustrated by research in the late 1930s, no-tillage was impractical at that time because of weed control and equipment limitations. Major improvements in herbicides were made during the late 1950s and 60s which led to widespread interest in developing no-tillage systems. The use of herbicides eliminated the need for 3-4 tillage operations [2]. Soil water content at planting is 50 percent higher in the herbicide plots versus the tillage plots [3].

The target goal of Texas groundwater management districts in 50 years is to have 50 percent of the Ogallala groundwater remaining for future generations. Recently, seven water management strategies were evaluated for their potential water-savings in North Texas [4]. A water savings of 1.75 inches per acre per year was estimated from shifting an acre from conventional to conservation tillage with herbicide applications substituting for tillage operations. Increasing conservation tillage from 50 percent of all irrigated acres in 2000 to 72 percent by 2060 was estimated to lead to a cumulative water savings over the 60-year period of 2.1 million acre-feet (682 billion gallons) [4]. Of the seven technologies, conservation tillage was the least costly in terms of increased cost per acre-foot of water saved. It is 80 times less costly than making changes to irrigation equipment.

References

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